WCB

ReSearch Secretariat

Research Report
Fall 2001

■ Message from the Chair, RAC

The Research Secretariat was created specifically to encourage and advance occupational health, safety and workplace research. The intent of the program is to uncover new knowledge, and to transfer the knowledge into the workplace where its benefits can be of use to both management and labour.

The Research Secretariat funds research through a competitive process designed to encourage the submission of projects of scientific excellence from researchers throughout the province. All projects submitted for funding are subjected to a multi-stage evaluation including scientific review by external experts, and a relevance review by a team of business and labour representatives.

In our first research competition, funding for 10 new research projects has been approved. The total amount of funding awarded is $1,399,948. The funded projects include: designing an affordable, ergonomically sound, lifting device for home support workers; developing and evaluating educational modules for physicians on musculoskeletal injuries; upgrading and expanding the capabilities of a mobile lung function laboratory; assessing shiftwork practice in B.C.; and evaluating risk factors for Parkinson's Disease and occupational cancer.

■ The Research Grant Process

The Research Secretariat awards funds through a competitive process. Each application for funding is evaluated in three stages:

Preliminary review: The Secretariat reviews each application for completeness and compliance with the parameters of the competition.

Peer review: Proposals that pass the Secretariat's preliminary review are then evaluated for scientific excellence by at least two external scientific reviewers.

Review by the Research Advisory Committee (RAC): The RAC reviews only those proposals that pass scientific review. The RAC is asked to rank the proposals based on relevance to the workplace and to make recommendations to the Secretariat on funding.

Approval of Funding: The Committee's consensus recommendations are then brought forward to the Research Priorities Committee and the Panel of Administrators. Decisions on funding are made by the Panel of Administrators.

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■ Research Priorities (2000-2001)

Through consultation with WCB staff and the Research Advisory Committee, six research themes were identified for our first competition:

Disease and injury

- Musculoskeletal injuries
- Low back disorders
- Occupational allergies
- Occupational asthma and chronic obstructive pulmonary disease
- Occupational stress (including post-traumatic stress disorder)
- Occupational cancer
- Factors influencing reporting/under-reporting of disease or injury

Determinants of workplace health

- Workplace design, engineering and conditions (including organization of work)
- Exposure to chemical, biological, physical agents (e.g., reproductive hazards, microbiological contaminants, etc)
- Occupational risk factors for diseases with unknown etiology (e.g., fibromyalgia, arthritic conditions)
- Impact of low level English-speaking skills or learning disabilities
- Influence of risk-taking behaviors or substance abuse on injury rates
- Influence of host susceptibility factors

Workforce and industry changes and their effects on injuries and diseases

- Workforce demographics (e.g., age, gender, immigration patterns)
- Economics (e.g., change in industry mix, restructuring, downsizing)
- Technology (e.g., changes in processes, products, services)

Health services research

- Evaluation of health care services
- Evaluation of medical treatment programs for injured or ill workers (e.g., use of narcotics, management of healing fractures in non-weight bearing limbs)
- Chronic pain (e.g., predictors, treatment options)

Intervention research

- Design, implementation, and evaluation of injury/disease prevention programs (e.g., early recognition of disease, surveillance)
- Evaluation of existing injury/disease prevention programs
- Evaluation of industry-based behavioral safety programs
- Effect of policy, regulation, and/or legislation changes on injury or disease rates (e.g., effect of ergonomics regulations on rates of musculoskeletal injuries)

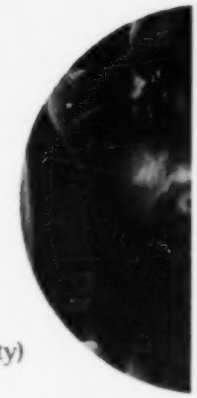
Disability management, rehabilitation and return to work

- Predictors of duration of disability
- Barriers to re-employment (in particular, of workers with musculoskeletal injuries, low back pain, chronic pain, etc).

WCB

Research Secretariat

Funded Projects



Lift Devices to Reduce MSI Among Home Support Workers in BC

Principal Investigator:
Nancy Paris-Seeley (BC Institute of Technology)

Keywords:
home support workers, lift devices, musculoskeletal injuries, psycho-physical measures, ergonomics, biomechanical loading

Purpose:
To design an affordable, ergonomically sound, lift device for use in the home by home support workers.

Abstract:
Home support workers are at increased risk for developing back injuries from lifting, twisting, and carrying heavy, often unpredictable, loads. Unlike workers in hospitals and nursing homes, home support workers work alone, often in small spaces with no mechanical lifting aids. Between 1994-1998, nearly 40 percent of accepted WCB claims from home support workers were for over-exertion accidents involving persons. These claims amounted to 4.5 million dollars and more than 65,000 days lost.

The project involves designing an affordable, ergonomic lifting device that can be used with commercially available swings and ceiling tracks. Laboratory tests will be conducted to compare the design with a commercially available lift device. The researchers will measure the biomechanical loading on the spine of home support workers performing lift and transfer procedures with and without the device. In addition, the researchers will collect information on the workers' perceptions of musculoskeletal comfort, safety and acceptability while performing the procedures. The researchers intend to make their design available to manufacturers to assist them in producing affordable lift systems. The results of this study will be used to educate policy makers on the use of lift devices for home support workers.

EMG-based Assessment and Classification of Low Back Pain (LBP)

Principal Investigator:
Theodore Milner (Simon Fraser University)

Keywords:
low back pain, EMG analysis, disability classification, muscle impairment

Purpose:
To develop an assessment tool to classify individuals with and without low back pain.

Abstract:
Previous research suggests that there is a difference in how individuals activate the muscles in the trunk region following an injury. This project will investigate the pattern of fatigue in back muscles and the muscle responses to an abrupt change in trunk posture to determine which parameters can best classify low back pain. Based on this information, an assessment tool will be developed and its accuracy will be determined.

It is anticipated that the project will lead to the development of an objective, accurate assessment tool for classifying low back pain. The tool can then be applied to identify appropriate interventions for reducing incidence of low back pain and to determine suitable timelines for return-to-work following an injury. Better classification will improve decisions regarding intervention and return-to-work timelines, thereby reducing risk of chronic low back pain.

Workplace Injury Management: Using New Technology to Deliver Physician Education

Principal Investigator:
Harry Karlinsky (University of BC)

Keywords:
workplace injury management, continuing medical education, online learning, videoconferencing, musculoskeletal injuries

Purpose:
To develop educational modules for physicians on activity-related soft tissue disorders (ASTDs) and the physician's role in return-to-work; and to evaluate the delivery of these modules in conventional and distance learning formats (video conferencing, web-based training, small group outreach visits, and lectures).

Abstract:
Diagnosing and managing ASTD and the physician's role in return-to-work planning represent two key areas for WCB-sponsored community physician education. Participating physicians will complete questionnaires before and after attending the educational presentations or, in the case of the web-based training alternative, viewing the online training modules.

The researchers expect to find gaps in the knowledge of physicians about ASTDs and return-to-work planning. After each type of educational intervention they expect to see a significant increase in knowledge related to each of these topics. Further, the increase in knowledge after videoconference or online training will be equal to or greater than the more traditional methods of delivering continuing medical education by small group presentation or lecture. This will reduce access barriers that currently limit many physicians from participating in continuing medical education events, and will facilitate the WCB's goal to deliver effective, accessible disability management educational programs to physicians throughout B.C.

The Prevalence, Nature and Risks of Voice Problems in Teachers

Principal Investigator:
Linda Rammage (University of BC)

Keywords:
voice disorders, teachers, occupational risk factors, questionnaire

Purpose:
To develop and pre-test a questionnaire on occupational risk factors for voice disorders.

Abstract:
Recently, researchers and clinicians have become aware of increasing numbers of teachers seeking treatment in voice clinics. Risk factors are poor acoustic conditions, heavy vocal demand, high exposure to viruses, inadequate vocal training and increasing classroom sizes.

A high prevalence of voice problems among teachers could have a negative impact on society, such as the extensive use of sick benefits, workers' compensation claims, and increased employment of substitute teachers. Extensive use of substitute teachers to replace vocally "sick" teachers disrupts instructional continuity. Vocally impaired teachers present poor speech signals, and may be forced to modify their teaching styles or curricula to accommodate poor voices; thus students' learning may be compromised, and poor examples of vocal communication reinforced.

Better information on the prevalence, nature and risks of voice problems among public school teachers in B.C. will lead to the development and implementation of effective preventive programs for occupational voice users. This will reduce costs and educational compromises associated with occupational voice problems.

Measuring Respiratory Health at B.C. Workplaces

Principal Investigator:
Susan Kennedy (University of BC)

Keywords:
occupational respiratory health, worksite surveillance, spirometry, nasal lavage

Purpose:
To upgrade and expand the capabilities of a mobile lung function laboratory.

Abstract:
Airborne irritants and allergens in the workplace contribute to asthma and chronic lung disease among British Columbians. These exposures can be specific chemicals, complex mixtures such as environmental tobacco smoke, or airborne bacteria and fungi. Although the burden of these diseases may not be seen directly in workers' compensation statistics, it is felt by employers and employees alike as increased sick time and short and long term disability, and reduced productivity and quality of life.

The UBC Occupational and Environmental Lung Disease Research Unit is an interdisciplinary team with the mandate to investigate respiratory illness in B.C. workplaces, and to help employers and employees use the research results to guide prevention strategies. An essential tool in this research is a mobile laboratory which enables researchers to simultaneously carry out breathing tests at the worksite and to measure the environment.

The funds will be used to replace two existing spirometry systems and to upgrade the laboratory to allow the measurement of early, reversible, signs of airway inflammation. The upgraded laboratory will be used in an ongoing study of theatrical smokes in the performing arts and in a new federally funded study evaluating the impact of chemical substitution intervention in the healthcare industry.

Shiftwork Practice in British Columbia

Principal Investigator:
Ralph Mistlberger (Simon Fraser University)

Keywords:
shiftwork, night work, circadian rhythms, sleep, adaptation

Purpose:
To assess whether advances in knowledge of optimal shift design have influenced shift schedules used in B.C. and whether workers receive training on techniques to improve adaptation.

Abstract:
Shiftwork requires employees to work and sleep at times of day in opposition to their natural daily rhythm of sleep-wake. This causes sleep loss and fatigue, impairs job performance and raises safety concerns. Shiftwork can also affect long-term health. Some types of shift schedules are associated with better employee adaptation.

The researchers will conduct a survey of shiftwork employers across industry sectors. The survey will collect information on shiftwork schedules and strategies used to cope with shiftwork in B.C. This information will be used to construct a provincial database of shiftwork practices. This database will be made available to industry and will be used by the researchers to identify appropriate workplaces for a future longitudinal study. In addition to constructing the database, the researchers will study shiftworkers at the Vancouver International Airport during mid-winter and mid-summer to assess the effect of day-length on shiftwork adaptation.

A Retrospective Cohort Study of Cancer Risks Among Nurses in B.C.

Principal Investigator:
Helen Ward (University of BC)

Keywords:
nurses, cancer incidence, mortality, occupational risk factors, breast cancer, anaesthetic gases, ionizing radiation, anti-neoplastic drugs

Purpose:
To determine whether nurses have a greater risk of cancer than the general B.C. population; and to evaluate occupational risk factors for developing breast cancer and other malignancies (ovarian, kidney, lung, leukemia). Occupational risk factors of interest are anaesthetic gases, ionizing radiation, and anti-neoplastic drugs.

Abstract:
The researchers will conduct a retrospective cohort study of nurses registered for at least one year between 1974 and 2000 with the Registered Nurses Association of British Columbia. Cohort records will be linked to the Canadian Mortality Data Base and to the Canadian Cancer Data Base. A subcohort of individuals potentially exposed to ionizing radiation will be linked to the National Dose Registry. Standardized mortality ratios and standardized incidence ratios will be used to compare the entire cohort and sub-cohorts (defined by employment in specific job categories) to the B.C. population. Relative risks will be computed to determine whether employment in a particular job category and duration of employment is associated with an increased risk of cancer and to evaluate dose-response relationships.

The information obtained from this study – particularly the information on exposure – will allow prevention activities in the healthcare sector to be targeted toward high-risk groups of nurses and other healthcare workers.

Occupational Risk Identification for Ovarian Cancer

Principal Investigator:
Nhu Le (BC Cancer Agency)

Keywords:
ovarian cancer, occupational risk factors, confounders

Purpose:
To identify occupational and non-occupational risk factors for ovarian cancer.

Abstract:
Ovarian cancer is the fifth most common malignancy in BC women and the primary cause of cancer death among gynecological malignancies. Mortality studies of B.C. women have shown elevated risks in teachers, nurses and hairdressers.

Women currently constitute about one-half of the B.C. workforce and, in the past 10 years, a significant number have moved into non-traditional jobs. For these reasons, women are potentially more exposed to occupational and industrial carcinogens than ever before. As more women are choosing to delay pregnancy and have fewer children, significant interaction may also occur between more prolonged exposure to workplace carcinogens and loss of the potentially protective effect of multiple births and early age at first birth for ovarian cancer.

This study will provide up-to-date information on occupational and non-occupational risk factors (such as reproductive history, family history of cancer, lifestyle factors). Non-occupational risk factors will be evaluated in two ways: as independent predictors of ovarian cancer risk, and as potential confounders. Should an association be observed, information obtained from this study will aid in developing occupational and non-occupational prevention strategies.

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Parkinson's Disease – Workplace Risk Factors and Host Susceptibility

Principal Investigator:
Kay Teschke (University of BC)

Keywords:
neurological disease, Parkinson's Disease, epidemiology, gene-environment interaction, respiratory infections, pesticides, metals, solvents, vibration, stress, occupational risk factors

Purpose:
To investigate whether associations exist between Parkinson's Disease and occupational exposure to respiratory infections, pesticides, metals, solvents, vibrations, or stress; and to investigate whether certain individuals are more susceptible to such exposures and are, therefore, more likely to develop the disease.

Abstract:
Parkinson's disease is a chronic neurodegenerative disorder, second only to Alzheimer's disease in frequency. The etiology of Parkinson's Disease is largely unknown. Most investigators estimate that about 10% of cases may have inherited disease. There is growing evidence that exposures to certain workplace chemicals (e.g., pesticides, metals, chemicals) may be risk factors for the disease. There is also reason to consider infections spread by respiratory droplets, vibration, and job strain as potential etiological exposures.

In this study, 600 individuals with Parkinson's Disease and 600 individuals randomly selected from the population will be interviewed about their jobs and workplace environmental exposures, as well as their medical histories, drug use, and smoking histories. In addition, each study participant will be asked to provide a small sample of cells from inside their mouth to allow genetic testing for susceptibility. The research outcomes will provide insights into the causes of Parkinson's Disease that may lead to occupational and public health interventions to reduce the incidence of this disease. This study will become part of a North American consortium of epidemiological studies aimed at identifying the causes of Parkinson's Disease.

A Case-Control Study to Identify Agricultural Chemicals Associated with Increased Risk of Prostate Cancer and In Vitro Screening of their Endocrine Disruption Activities

Principal Investigator:
Nhu Le (BC Cancer Agency)

Keywords:
prostate cancer, agriculture industry, endocrine system, endocrine disruptors, in vitro screening

Purpose:
To identify agricultural chemicals that are associated with an increased risk of prostate cancer, to evaluate whether these substances have the ability to disrupt the endocrine system, and to assess what their role might be in the development and progression of prostate cancer.

Abstract:
Several studies have identified associations between farming occupations and increased risk of prostate cancer. Exposures suggested as potential risk factors include: pesticides, insecticides, fertilizers, herbicides and other agricultural chemicals.

To examine occupational risk factors for prostate cancer, the researchers propose to use a matched case-control design. Agricultural chemical exposures will be estimated by linking job histories for cases and controls with a job exposure matrix previously developed for the agriculture industry of B.C. Logistic regression techniques will be used to examine the relationship between the risk of prostate cancer and exposure to agricultural chemicals. Other important confounding factors will also be taken into account.

Agricultural chemicals identified as potential carcinogens will then be examined in vitro to detect compounds which may affect the hormonal action of androgen receptors and to assess the activity of aryl hydrocarbon receptor-mediated transcription. Information obtained from this study will aid in developing strategies to prevent prostate cancer.

Research Advisory Committee

Employer Representatives

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Canada Post

Eric Skowronek
BC Maritime Employers Association

Dale Versfelt
Construction Labour Relations Association

Chair

Richard Gallagher, Head
Cancer Control Research Program
BC Cancer Agency

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United Steelworkers of America

Joe Divitt
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Important Dates for Next Competition:

Call for proposals: October 2001
Deadline for submissions: January 31, 2002
Decisions on funding: June 2002

WORKERS' COMPENSATION BOARD OF BRITISH COLUMBIA

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